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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,570	06/08/2001	Chandrika Kamath	IL-10714	1692

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EXAMINER	
AMSBURY, WAYNE P	

ART UNIT	PAPER NUMBER
2171	8

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PR4

Office Action Summary	Application No. 09/877,570	Applicant(s) KAMATH ET AL.	
	Examiner Wayne Amsbury	Art Unit 2171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-17,19-26 and 28-35* is/are rejected.

7)☐ Claim(s) *9,18,27 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

CLAIMS 1-36 ARE PENDING

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Applicant's arguments filed 11/21/03 have been fully considered but they are not persuasive.

Applicant fails to recognize the breadth of the claims. In particular, the term *module* has little or no patentable weight in light of the state of the art and the references previously applied and applied herein. This term refers in the art to a collection of routines and data structures that performs a particular task or implements a particular abstract data type. Modules usually consist of an interface and an implementation accessible only to the module. **Official notice** is taken that the objects of an object oriented programming system, (such as those taught in the references applied below), are modules by this definition.

With respect to the arguments, it is noted that on page 10 the references are faulted by stating that they fail to show: *an entire claim*. This does not specify where the failure might lie nor address the previous remarks of the Examiner. It is stated [on page 11] that what Busche and Agrawal fail to show is: "the missing structure and steps of Applicants amended claims." It can be inferred that this "missing structure" is the use of modules, addressed above and in the rejections below.

It is also stated [on page 11] that the Busche "does not show object-oriented systems in the context of decision trees." Examiner respectfully disagrees, as demonstrated by the previous rejections, but for the sake of clarity, completeness, and in the interest of compact prosecution, a reference [Yamada et al] is provided which is explicit evidence that this application of object-oriented programming was well known in the art at the time of the invention.

3. **Claims 1-8, 10-17, 19-26 and 28-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busche et al (Busche), US 6,430,547 B1, 06 August 2002 in light of Agrawal et al (Agrawal), US 6,230,151 B1, 08 May 2001 in further light of Yamada et al (Yamada), US 5,319,740, 07 June 1994.**

For the sake of clarity it is noted that the exemplary claim 1 consists of a pattern recognition module comprising two parts and a link. One component is a decision tree with (sub-)modules, and the other is a generic data mining system, with a link between its storage and the decision tree system. Broader claims, such as claim 19, have similar and more generic limitations.

It would have been obvious to one of ordinary skill in the art at the time of the invention to implement a decision tree as a system of object-oriented modules, as evidenced by Yamada, because this implementation enables a process step and data to be treated as one object [COL 5 line 67 to COL 6 line 7].

As to **claim 19**, Busche is a data mining system, as evidenced by TITLE, ABSTRACT, and SUMMARY. The files of Busche include collected geological and remotely sensed samples [SUMMARY]. Objects such as data points, properties, and associated information are identified in the files digitally stored as representations of the samples [COL 1 lines 47-60].

Features such as chemical properties, location, and hidden relationships are extracted [SUMMARY] and patterns of relationships are determined. The features of the samples in Busche are relevant to a better understanding of the geology of a region [COL 1 lines 37-41].

Busche is clearly modularized [FIG 4], and teaches that much of the work in this area focuses on the use of parallel processing [COL 9 lines 42-44; COL 4 lines 50-53]. Busche recognizes a large variety of systems and data types, some plotted in two dimensions [COL 5 lines 64-65, some presented as three-dimensional [COL 6 lines 15-35; FIG 3], some as decision trees [COL 6 lines 60-65], some as text [throughout] including rules. Busche recognizes the use of object-oriented programming systems [COL 3 line 61 to COL 4 line 2].

Agrawal teaches the use of parallel classification for data mining in a multiprocessor system [TITLE; COL 2 lines 61-65, and elsewhere], teaches sorting in parallel [COL 4 lines 47-49], and the application of split tests to allocate processor shares [COL 4 lines 49-53].

As noted above, Busche recognizes the efficacy of parallel processing and the use of decision trees but Busche does not address details of the use of decision trees such as the use of a split test. Yamada, as noted above, teaches the object-oriented implementation of decision trees.

Agrawal is directed to this particular mode of decision trees in data mining. Agrawal does not explicitly address programming techniques such as object-oriented programming and modularity.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the parallel decision tree data mining of Agrawal with the object-oriented programming techniques of Busche because this would combine a decision-tree classifier that is fast, compact, and scalable on large data sets with the use of object-oriented technology for modularization and organization of large programs.

To the extent that it is not inherent to link a decision management and/or pattern recognition system to the relevant data, Yamada addresses this throughout, as at FIG 17; Busche does so throughout as in FIG 4; Agrawal does so throughout, as at FIG 14 where the leaves contain data of the data mining system.

As to **claim 20**, Agrawal applies a variety of split tests [COL 4 line 47 and after], including splitting based on a numerical attribute [COL 4 line 65 and thereafter]. The Specification calls this a feature of "traditional decision trees" [page 17].

As to **claims 21-26**, the use of a Gini index, the CART-LC and the OC1 algorithms were well known at the time of the invention, as evidenced in the Specification at pages 14 and 18-20. As noted in the Specification on page 16, Quinlan

suggested the use of the Information Gain Ratio as an improvement on Information Gain.

[As to **claim 24**, also see Agrawal COL 5 lines 6-8.] The Specification at page 20 **[0053]** teaches that evolutionary algorithms are well known.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply well known splitting algorithms because this is more efficient than generating and debugging a new splitting rule.

The elements of **claims 1-8, 10-17, 28-35** are rejected in the analysis above and these claims are rejected on that basis.

4. **Claims 9, 18 and 27** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 36 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art of record fails to anticipate or teach the application of the twoing rule [Specification page 15] to parallel decision tree splitting in an object-oriented data mining paradigm.

5.Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wayne Amsbury whose telephone number is 703-305-3828. The examiner can normally be reached on M-TH 7-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic can be reached on 703-308-1436. The fax phone number for the organization where this application or proceeding is assigned is 703-746-7239.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9700.

WPA

WAYNE AMSBURY
PRIMARY PATENT EXAMINER